



# Hydrogen Station Demonstrations

## Lessons Learned Workshop

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# Chino, CA Hydrogen Station



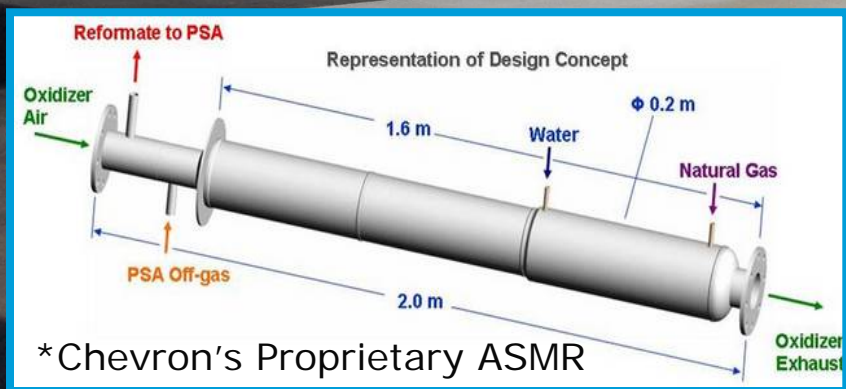
\*Chevron's Proprietary ATR

# Oakland, CA Hydrogen Station





# SANGB, MI Hydrogen Station





# Rosemead, CA Hydrogen Station



# Orlando, FL Hydrogen Station





# H2 Demonstration Program Partners



**Project Lead**



**Cost Share Providers**



**Technology Providers**



**Technology & Funding**



**Site Hosts  
&  
Vehicle Operators**



**Vehicle Operators**

**Partners Should Have Complimentary Objectives,  
Cultures And Capabilities**

# Typical Hydrogen Station Details

## Technical Capability

High Pressure Steam Methane Reforming  
114 kg/day generation  
312 kg storage

Single Dispenser  
5000 psig  
Fill Rate – up to 3.6 kg/min

## Infrastructure Components

Blast Resistant Walls  
Ventilated Roof Design

■ Aesthetics in mind

Water Treatment System

Remote Monitoring/Controls  
Fire Detection System-UV/IR  
Gas Leak Detection Systems

Cooling System for Process Equipment  
Security System  
Safety Instrumented System (SIS)

■ Shut Down

■ Call Out Notification

Fire Alarm Control Panel

## Operation

Frequent Infrastructure Leak Check with  
Handheld Hydrogen Detector

Hydrogen Trained Operators On Site

Leak Check with Handheld Hydrogen  
Detector Checks Before Each Fueling

**Developing And Operating H2 Fueling Infrastructure Is A Complex Task – There Is No Compromising Safety**



# Technology Evaluation

Station Location	Production Technology	Daily Fueling Capacity (kg)	Typical Daily Demand (kg)	Current Station Fleet
Chino, CA	ATR	10	6	6 HMC FCVs
Oakland, CA	SMR x 2	150	50	7 HMC FCVs 3 FCV Buses
Orlando, FL	SMR	100	90	8 HICE Buses
Rosemead, CA	Electrolyzer	36	10	6 HMC FCVs
Selfridge, MI	SMR	40	6	2 HMC FCVs
Other				1 HMC FCV at CARB, 1 HMC FCV at CaFCP
Totals	6 Technologies Deployed	336	162	



**Supply &  
Demand  
Coordination  
Required**

# Outreach Model

Timing	Stakeholder	Method of engagement
Prior to construction of demonstration station	Local elected officials, permitting officials and first responders	Face-to-face meetings with representatives from CTV and/or project participants.
	Residents within 500 feet of proposed site of hydrogen demonstration station	Town hall meeting conducted by CTV and project participants. Invitations were mailed to residents within 500 feet of the proposed site.
Prior to station operation	Local elected officials and permitting officials	Ongoing face-to-face meetings to keep officials up to date and to obtain necessary permits.
	Local community	Sponsorship of or participation in community events such as school science fairs or Earth Day events.
	First Responders	First Response training to cover new technologies.
	Residents, local elected officials, permitting officials and first responders	Town hall meeting and station tours to provide a first-hand look of the technology.
Station in operation	Local elected officials and permitting officials, local community	Station tours on request.
	First Responders	Continued training to refresh personnel and provide any new information and to inform new First Responder personnel.

***Effective Outreach Is Essential For Technology Demonstrations***

# Key Results as of YE07

## Accomplishment:

CTV has developed the **technical** capability to meet 7% to 10% of a conventional gasoline station's daily fuel dispensing requirement using on-site hydrogen production.

## Challenge:

**Reduce the cost** of dispensed hydrogen to be competitive with conventional fuels (\$3.00/gge).

**Decrease the required footprint** at the forecourt; likely through improvements in hydrogen storage.

**Messaging About State of Technology Readiness Is Essential**

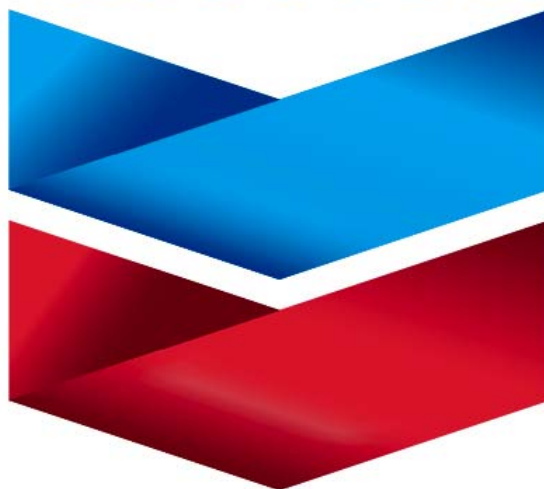


# Summary Learnings

- Partners Should Have Complimentary Objectives, Cultures And Capabilities
- There Is No Compromising Safety
- Effective Outreach Is Essential For Technology Demonstrations
  - Public Outreach Will Be Essential During The Early Stages Of Infrastructure Development
- Supply & Demand Coordination Required
- Messaging About State of Technology Readiness Is Essential



**Chevron**



**THANK YOU**